

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A power-folding vehicle mirror assembly comprising:

a base mountable to a vehicle;

a clutch body mounted to and rotationally fixed to the base;

5 a sun gear slidably mounted to the base for rotation about a first axis, the sun gear biased towards engagement with the clutch body by a biasing means;

a mirror head assembly rotatably mounted to the base;

10 a planetary gear mounted to the mirror head assembly for rotation about a second axis, the planetary gear meshing with the sun gear; and

15 a motor operably connected to the planetary gear for driving the mirror head assembly around the sun gear,

wherein, upon the application of a manual breakaway force to the mirror head assembly, the planetary gear transmits a breakaway torque to the sun gear, the breakaway torque sliding the sun gear away from and out of engagement with the clutch body, thereby allowing rotation of the sun gear and mirror head assembly with respect to the base while maintaining mesh with the planetary gear.

2. An assembly as claimed in claim 1 wherein the biasing means comprises a spring.

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3. An assembly as claimed in claim 2 further comprising ramped detents on the clutch body bearing against corresponding detents on the sun gear,

whereby the ramped detents enable an axial force to be generated as the detents are rotationally forced against each other, the axial force working against the spring to enable the sun gear to disengage from the clutch body thereby allowing relative rotation.

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4. An assembly as claimed in claim 3 wherein the planetary gear is a worm gear.

5. An assembly as claimed in claim 4 wherein the spring comprises a disc spring.
6. An assembly as claimed in claim 5 wherein the spring has a negative spring rate.
- 5 7. An assembly as claimed in claim 6 wherein the first and second axes are orthogonal, the sun gear is helically formed at a first helix angle and the worm gear is helically formed at a second helix angle complimentary to the first helix angle.
- 10 8. An assembly as claimed in claim 7 wherein the ramped detents are ramped so that the breakaway torque is substantially the same in either breakaway direction.
9. An assembly as claimed in claim 8 wherein the mirror head assembly comprises:
an arm having a proximal end rotatably mounted to the base and a distal end
15 remote from the base;
a head mounted to the distal end of the arm; and
a mirror mounted to the head.
10. An assembly as claimed in claim 9 wherein the planetary gear and motor are
20 housed within the arm.
11. A clutch and reduction drive assembly comprising:
a first gear mounted to a first body for rotation about a first axis;
a second gear meshing with the first gear, the second gear mounted to a
25 second body for rotation about a second axis; and
a clutch mechanism having a clutch body and a clutch body receiving portion,
the receiving portion mounted to or integral with the second gear, the clutch
mechanism preventing relative rotation between the clutch body and the second
gear in an engaged position and allowing relative rotation between the clutch
30 body and the second gear in a disengaged position,

characterised in that the clutch mechanism is disengagable by movement of the second gear together with the receiving portion with respect to both the clutch body and the first gear while the second gear remains meshing with the first gear, the movement in a direction along the second axis of rotation.

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12. An assembly as claimed in claim 11 wherein the clutch mechanism is loaded by a spring.

10 13. An assembly as claimed in claim 12 wherein the clutch mechanism further comprises ramped detents on the clutch body bearing against corresponding detents on receiving portion,

15 whereby the ramped detents enable an axial force to be generated as the detents are rotationally forced against each other, the axial force overcoming the load on the clutch mechanism provided by the spring thereby enabling the clutch mechanism to disengage.

14. An assembly as claimed in claim 13 wherein the first gear is a worm gear.

15. An assembly as claimed in claim 14 wherein the worm gear is driven by a motor.

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16. An assembly as claimed in claim 15 wherein the motor drives the worm gear through a reduction gear drive.

25 17. An assembly as claimed in claim 16 wherein the reduction gear drive includes a further worm gear.

18. An assembly as claimed in claim 17 wherein the spring comprises a disc spring.

19. An assembly as claimed in claim 18 wherein the spring has a negative spring rate.

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20. A clutch and reduction drive assembly comprising:

- a primary frame;
- a clutch body mounted to and rotationally fixed to the primary frame;
- a primary gear slidably and rotatably mounted to the primary frame for rotation about a first axis, the primary gear biased towards engagement with the clutch body by a biasing means;
- a secondary frame rotatably mounted to the base; and
- a secondary gear mounted to the secondary frame for rotation about a second axis, the secondary gear meshing with the primary gear,

10 wherein the primary gear is movable against the biasing means from an engaged position in which rotation with respect to the clutch body is prevented to a disengaged position in which rotation with respect to the clutch body occurs.

21. An assembly as claimed in claim 20 wherein the biasing means comprises a

15 spring.

22. An assembly as claimed in claim 21 further comprising ramped detents on the

clutch body bearing against corresponding detents on the primary gear,

20 whereby the ramped detents enable an axial force to be generated as the detents are rotationally forced against each other, the axial force working against the spring to enable the primary gear to disengage from the clutch body thereby allowing relative rotation.

23. An assembly as claimed in claim 22 wherein the secondary gear is a worm gear.

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24. An assembly as claimed in claim 23 wherein the spring comprises a disc spring.

25. An assembly as claimed in claim 24 wherein the spring has a negative spring rate.

26. An assembly as claimed in claim 25 wherein the first and second axes are orthogonal, the primary gear is helically formed at a first helix angle and the worm gear is helically formed at a second helix angle complimentary to the first helix angle.

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27. A power-folding vehicle mirror assembly substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.